European States, as well as in Japan; while in Germany, with the tacit consent of the Government, it has been adopted by the industries concerned. In eight or nine other countries the use of the metric carat is permissible, but other carats are not prohibited. Early in 1908 some of the principal diamond merchants in the United Kingdom were approached by the Board of Trade with the view of ascertaining whether the trade were prepared to adopt the metric carat. The replies received were mainly unfavourable to this project. It would be interesting to learn whether the fact that the metric carat is now generally recognised abroad has had any effect in modifying the views of the trade in this country on the subject.

Tome xv. of the Travaux et Mémoires of the Bureau is being rapidly prepared for the press. It will contain an account of the investigations by MM. Benoît, Fabry, and Perot on the determination of the metre in terms of wave-lengths of light, and an article by Dr. Guillaume on the recent progress of the metric system. If space permits, a memoir on end measures of length will also be included.

AUSTRALIAN ZOOLOGY.[1]

IT is a somewhat humiliating reflection for British zoologists that such an important and prosperous part of the British Empire as the Australian Commonwealth should have to depend so largely upon German enterprise for the investigation of the native fauna. It is, of course, true that a vast amount of good work has been done by naturalists resident in Australia, and by British scientific expeditions, and as regards the vertebrates, we perhaps already have a fairly complete knowledge of the Australian fauna.

So far as the invertebrates are concerned, however, the work seems to be little more than begun. The Australian Museum at Sydney has published in the "Records" and "Memoirs" numerous important contributions to our knowledge of special groups, and also the results of various collecting expeditions, which deal with more extensive sections of the invertebrate fauna. We remember also that the late Sir Frederick McCoy published several volumes of a prodromus of the Australian fauna, in which many invertebrates were excellently figured, but the series came to an untimely end. The late Mr. Bracebridge Wilson, again, made extensive collections of marine invertebrates in the neighbourhood of Port Phillip, but a portion only of these has ever been properly investigated. Individual workers, whose names are well known in the scientific world, have made most valuable contributions to our knowledge of special groups, such as the Sponges, Hydrozoa, Polyzoa, Earthworms, Land Planarians, Mollusca, Crustacea, Onychophora, Insecta, and Arachnida. One might almost say, however, that although a good many mouthfuls have been taken (especially in the plummiest parts), Australian zoologists have not as yet developed a sufficiently keen appetite to make any very serious combined attack upon the invertebrate pudding as a whole. This is by no means altogether their fault, for it is useless for men of science to devote their lives to laborious investigations—and those of a kind which brings but little credit except amongst a narrow circle of specialists—if there is not sufficient financial support forthcoming to publish the results in a satisfactory manner, to say nothing of paying the investigators. Even the greatest enthusiasm is soon damped for want of appreciation.

It is here that our German colleagues, with their usual thoroughness, are again leading the way. The Hamburg expedition to South-West Australia in 1905 must have reaped a rich harvest, and the results are now being given to the scientific world in a series of handsome and copiously illustrated volumes which do great credit to authors and publishers alike, and far excel any attempts which have been made for many years past to deal with the Australian fauna. The third volume is now in progress, and we have before us Lieferungen vi.–x. In these parts Dr. Carl Graf Attems deals with the Myriapods (excluding Scolopendridæ); Prof. Kieffer describes the Serphidæ and Evaniidæ; Ester Lager the Phyllopods; and Dr. Hentschel continues his account of the Tetraxonid Sponges. We notice that all the illustrations in these parts are text-figures, evidently reproduced by some photographic process, and the results obtained appear to be on the whole quite satisfactory. They are doubtless comparatively inexpensive, but from the artistic point of view they cannot be considered as equal to good lithographic work. This is more especially evident in the case of the sponge spicules.

It is, of course, quite impossible to notice such a work as this in any detail. We may say, however, that the volumes will be absolutely indispensable to future investigators of the Australian fauna, and we venture to hope that they will serve as a stimulus to the numerous British naturalists in Australia to continue their own excellent work in the same systematic and thorough manner.

[1] "Die Fauna Südwest-Australiens. Ergebnisse der Hamburger südwest-australischen Forschungsreise 1905." Herausgegeben von Prof. W. Michaelsen und Dr. K. Hartmeyer. Band iii., Lieferung 6–10: Lief. 6, "Myriapoda exkl. Scolopendridæ," von Dr. Carl G. Attems; Lief. 7, "Serphidæ und Evaniidæ," von Prof. J. J. Kieffer; Lief. 8, "Actiniaria," von E. Lager; Lief. 9, "Phyllopoda," von Dr. E. Wolf; Lief. 10, "Tetraxonida," 2 Teil, von Dr. E. Hentschel. Pp. 147–393. (Jena: Gustav Fischer, 1911.) Price 18 marks.

PROF. W. SPRING.

AS already announced, Prof. W. Spring, professor of chemistry in the University of Liège, died on July 17, in his sixty-third year; by his death Belgium has lost one of her foremost men of science, and physical chemistry has been deprived of an eminent investigator.

From the point of view of British chemists and metallurgists, the work of Spring has been to some extent hidden by being published almost entirely in the proceedings of the Royal Belgian Academy, so that only the more striking results of his work have become generally known. Thus Spring's name is principally associated with his work on the effect of high pressures upon chemical combination and upon the welding of particles of metals and alloys. The progress of our knowledge of physical chemistry generally, and that of metals particularly, has made us very familiar with the idea and the phenomena of diffusion in solid bodies, even at temperatures far below their fusion-point, but the researches of Spring were among the earliest to give actual data on such phenomena. Thus Spring showed in 1894 that carefully surfaced pieces of copper and zinc placed in contact in vacuo became welded together, and that at the interface a layer of yellow alloy was formed. It was not until 1896 that the late Sir William Roberts-Austen published his own classic work on the interdiffusion of solid lead and gold. Spring's work on the effect of pressure in bringing about chemical reactions between finely-powdered bodies also tended to demonstrate the molecular mobility of solids.

Perhaps the best-known work of Spring was that in which he showed what he believed to be the formation of actual alloys by the action of high-pressures upon mixtures of the pure metals in powder form. His experiments were very striking, and showed clearly that by compressing metallic powders, solid blocks of metal could be produced, and he showed

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further that this was accomplished without any fusion of the metal under pressure. The fact that the resulting masses were true alloys he sought to demonstrate by showing that, if the metallic powders were correctly proportioned, the resulting metal showed the low melting-points of fusible alloys and eutectics. Unfortunately the aid of the microscope was not called in for the study of these "alloys," and, indeed, the greater portion of Spring's researches were carried out before the modern methods of metallography were available, but it has since been shown that the compressed masses of solid metal produced by Spring consisted of the practically unaltered particles of the original powder, simply welded together under the action of the pressure, but without the formation of those structural constituents of the corresponding true alloys. The low melting-points of such mixtures must be attributed to local action at the boundaries of the constituents and the rapid diffusion following the appearance of liquid metal at these points. Although, therefore, Spring's original conclusions were not entirely confirmed by subsequent research, his work has borne much fruit; his demonstration of the possibility of extruding bismuth in the form of thin wire shed new light on the whole question of brittleness and plasticity, and has largely contributed to the development of the modern processes of extruding metals and alloys for industrial purposes.

Spring's activities were not confined to the physical chemistry of metals, however, but extended to researches on the colour of sky and water and on colloidal solutions—to mention only a few of the other sides of his work. It is even claimed for Spring by his friends that in his researches on turbid media he anticipated the "ultra-microscope" in principle to such an extent that the apparatus he describes differs from that now in use only in regard to the power of the microscope employed.

The sum-total of the late Prof. Spring's researches constitute a monument of a life of intense scientific activity, and it may be hoped that these researches may now be gathered together so as to make them more readily accessible, and thus to secure for them the full recognition which they deserve.

NOTES.

THE German Emperor has conferred upon Sir William Ramsay, K.C.B., F.R.S., president-elect of the British Association, the order "Pour le Mérite."

WE notice with regret the announcement of the death, on August 18, at eighty years of age, of Mr. S. H. Burbury, F.R.S., distinguished by his work in mathematical physics, especially in the theories of electricity and magnetism and the kinetic theory of gases.

A REUTER message from St. Petersburg states that the Minister of the Interior has prohibited for the year 1911 the trade in marmots along the Eastern Chinese Railway, and also the forwarding of marmot skins, flesh, and fat by rail. This measure has been taken as a precaution against pneumonic plague.

THE divisions of vertebrate and invertebrate palæontology and palæobotany in the U.S. National Museum have been combined, we learn from *Science*, into a new division of palæontology, with Dr. R. S. Bassler as curator in charge, Mr. J. W. Gidley as assistant curator of fossil mammals, and Mr. C. W. Gilmore as assistant curator of fossil reptiles.

IT is officially announced that the Governor of British Guiana has reported the adoption, as from August 1, of maritime time, which is standard time four hours slow on Greenwich time. The same standard time has been adopted in the island of Granada, as from July 1, the effect being to put back the local time of that colony by seven minutes.

IT is surprising at the present day, when the system of time-reckoning by reference to standard meridians is being adopted throughout the civilised world, that the city of Canterbury seems determined to maintain its own local time. The Dean and Chapter, in mediæval spirit, refuse to recognise any such "modern innovation" as Greenwich time, and have recently distributed cards intimating that the time observed in Canterbury Cathedral is 4½ minutes ahead of Greenwich time. The post-office and railway clocks are kept to Greenwich time, and the others anywhere between that and the cathedral clock. The resulting confusion has induced Mr. A. Lander, of 17 High Street, Canterbury, scientific instrument maker, and secretary of the East Kent Natural History Society, to make an electric clock which is kept to standard time by means of the wireless time signal from the Eiffel Tower. The first of the three time signals is received on Morse tape travelling at the rate of half an inch per second, and the half-minute contacts of the electric clock are also recorded on the same tape, so that the rate of the clock can be accurately determined. The second signal is utilised to correct the pendulum of the master clock, and the third signal is again received on the tape to show that the clock is exactly correct. This master clock works a number of clocks and instruments on Mr. Lander's premises, such as a rain-gauge, sunshine recorder, barograph, and also a large dial in the shop window, and drops a time-ball exactly at each standard hour.

THE twenty-second annual general meeting of the members of the Institution of Mining Engineers will be held at Cardiff on Wednesday, September 13, under the presidency of Dr. J. B. Simpson. The following papers will be read, or taken as read:—the reduction, control, and collection of coal-dust in mines, S. Mavor; a rope-driven coal-cutter, W. Maurice. A number of papers which have already appeared in the Transactions of the institution will also be open for discussion.

THE death has occurred, in his seventy-second year, of Dr. J. P. Schweitzer, who was connected with the University of Missouri from 1872 to 1906 as professor first of chemistry and later of agricultural chemistry. He was a native of Berlin, and after studying at Göttingen was for a time assistant to Heinrich Rose at Berlin. He went to America in 1865, and held posts at the polytechnic institute of Philadelphia and the Columbia School of Mines before receiving his Missouri appointment.

A REMARKABLE crystal of aquamarine was described by Dr. G. F. Kunz before the New York Academy of Sciences on April 3. It was discovered by a miner on March 28, 1910, in a pegmatite vein at Marambaya, near Arassuahy, on the Jequitinhonha River, in Minas Geraes, Brazil. Its colour was greenish-blue, its form a slightly irregular hexagonal prism terminated at both ends by flat basal planes, its length 48·5 cm. and width from 40 to 42 cm., and its weight 110·5 kg., and its transparency was so perfect that it could be seen through from end to end. It is estimated that 200,000 carats of aquamarines of various sizes could be cut from it.

MR. J. ALLAN THOMSON, who has been appointed palæontologist to the Geological Survey of New Zealand, was the first New Zealand Rhodes scholar at Oxford, where he was also Burdett-Coutts scholar. He received

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